

PBTs

Brief Chemical Specific Descriptions

<u>PBT</u>	<u>Current or Past Uses</u>
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Aldrin/Dieldrin

Pesticide – soil insecticide to control root worms, beetles, termites, soil and seed treatment, and in specific public health situations – used to control disease carriers like mosquitoes and tsetse flies.
Banned – importation and manufacture prohibited in US¹

4-Bromophenyl phenyl ether

4-bromophenyl phenyl ether has been detected in drinking and surface waters, but the sources are not clear. It is suspected that 4-bromophenyl phenyl ether is formed during chlorination treatment of sewage and drinking water. If released to water, 4-bromophenyl phenyl ether adsorbs significantly to sediment and suspended material².

Chlordane

Pesticide – termite control for houses; insecticide for corn crops.
Banned – Importation and manufacture prohibited in US since 1988.³

Chlordecone (Kepone)

Chlordecone is a tan-white crystalline odorless solid. Chlordecone was used as an insecticide on tobacco, ornamental shrubs, bananas, and citrus trees, and in ant and roach traps. Chlordecone was also known as Kepone.
Banned – Importation and manufacture prohibited in US since 1978.⁴

¹ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>)

² Spectrum Laboratories, Ft. Lauderdale, FL – Chemical Fact Sheet: 4-Bromophenyl phenyl ether

³ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>)

⁴ *Toxicological Profile for Mirex and Chlordecone*, 1995, Agency for Toxic Substances and Disease Registry, United States Public Health Service.

DDT/DDD/DDE

Pesticide – controlled insects that carry diseases such as malaria and typhus.

Banned – importation and manufacture prohibited in US since 1972 (except in public health emergencies). Restricted use allowed in primarily tropical countries.⁵

Di-n-octyl phthalate (DnOP)

Used in PVC utilized in the manufacture of flooring and carpet tile, canvas tarps, swimming pool liners, notebook covers, traffic cones, toys, vinyl gloves, garden hoses, weather stripping, flea collars, and shoes. DnOP containing phthalate substances are also used in PVC intended for food applications such as seam cements, bottle cap liners, and conveyor belts. Release of DnOP to the environment can occur during the production of C6–10 phthalates and during the incorporation of the phthalates into plastic resins. Because phthalates are not bound to plastics, DnOP can be released during the use or disposal of the product.⁶

Endrin

Endrin is a solid, white, almost odorless substance that was used as a pesticide to control insects, rodents, and birds. Endrin has not been produced or sold for general use in the United States since 1986⁷.

Heptachlor epoxide

A breakdown product of heptachlor. Heptachlor was extensively used for killing insects in homes, buildings, and on food crops.

Banned – importation and manufacture banned in US since 1988.⁸

⁵ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>)

⁶ From NTP-CERHR Expert Panel Report on D—n-octyl Phthalate, December, 2000.

⁷ *Toxicological Profile for Endrin, 1997*, Agency for Toxic Substances and Disease Registry, United States Public Health Service

⁸ *Toxicological Profile for Heptachlor Epoxide, 1993*, Agency for Toxic Substances and Disease Registry, United States Public Health Service

Hexabromobiphenyl

Polybrominated biphenyls (predominantly hexabromobiphenyl) were used as flame retardant additives in synthetic fibers and molded plastics. Manufacturers of polycarbonates, polyesters, polyolefins, and polystyrenes have used polybrominated biphenyls.

Banned - polybrominated biphenyls are not presently used in consumer products. The sole U.S. producer of hexabromobiphenyl ceased production in November 1974 because of an incident in 1973 in which the chemical was mistaken for a nutrient additive and 2000 lb was added to animal feed, resulting in the destruction of thousands of farm animals.⁹

Hexachlorobenzene

Although HCB is no longer directly used, it is still found in our environment as a by-product of certain activities and because of past use.

Past uses:

- Used to make fireworks and ammunition
- Used to manufacture synthetic rubber
- Used as a fungicide to protect wheat and other seeds

Potential Sources to our Environment:

- By-product when making other chlorine-containing compounds
- Found in water sediments
- By-product when manufacturing some pesticides
- Use of HCB-contaminated pesticides
- Found in chlorination treatment of process water and wastewater
- Incineration of municipal and hazardous wastes
- By-product when making chemical solvents (chemicals used to dissolve other chemicals)¹⁰

⁹ POLYBROMINATED BIPHENYLS (PBBs) First Listed in the *Fourth Annual Report on Carcinogens*

¹⁰ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>)

Hexachlorobutadiene

Used primarily to make rubber compounds, as a solvent, to make lubricants, in gyroscopes, as a heat transfer liquid, and as a hydraulic fluid.¹¹

Mirex

Mirex is a white crystalline odorless solid. Mirex was used to control fire ants, and as a flame retardant in plastics, rubber, paint, paper, and electrical goods from 1959 to 1972. Mirex was sold as a flame retardant under the trade name Dechlorane.

Banned – Importation and manufacture prohibited in US since 1978¹²

Octachlorostyrene

Formed when graphite anodes are used during electrolytic production of magnesium from magnesium chloride. By-product of wastes from the electrolytic production of chlorine prior to 1970 when graphite anodes and coal tar pitch binder were used.¹³

Pentabromo diphenyl ether

Penta-BDE is used in unsaturated polyester, rigid and flexible polyurethane foam, epoxies, laminates, adhesives and coatings. Typical end products containing Penta-BDE include mattresses, seat cushions and other upholstered furniture, and rigid insulation. Commercial production of Penta-BDE is expected to cease at the end of 2004^{14,15,16}.

¹¹ ATSDR Toxicological Profile, May 2001

¹² *Toxicological Profile for Mirex and Chlordane*, 1995, Agency for Toxic Substances and Disease Registry, United States Public Health Service

¹³ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>)

¹⁴ Great Lakes Chemical Corp., “Technical Information: Great Lakes DE-71” www.e1.greatlakes.com/pdf/datasheet/DE-71%20ds.PDF, viewed 6 July 2004.

¹⁵ Great Lakes Chemical Corp., “Technical Information: Great Lakes DE-61” www.e1.greatlakes.com/pdf/datasheet/DD-61%20Data%20Sheet.PDF, viewed 6 July 2004.

¹⁶ Great Lakes Chemical Corp., “Technical Information: Great Lakes DE-62” www.e1.greatlakes.com/pdf/datasheet/DE-62%20Data%20Sheet.PDF, viewed 6 July 2004.

Polycyclic aromatic hydrocarbons (PAHs)

PAHs are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil, gas, garbage, indoor and outdoor fires, forest fires, and other organic substances like tobacco and charbroiled meat. Usually found as a mixture containing two or more PAH compounds. PAHs are found in coal tar, crude oil, creosote, and roofing tar. Also used in medicines, personal care products, and to make dyes, plastics and pesticides.¹⁷

Polychlorinated biphenyl's (PCBs)

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

Banned – Manufacture and use prohibited since 1977.¹⁸

¹⁷ *Toxicological Profile for PAHs, 1996*, Agency for Toxic Substances and Disease Registry, United States Public Health Service.

¹⁸ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>); *Toxicological Profile for PCBs, 2001*, Agency for Toxic Substances and Disease Registry, United States Public Health Service.

Polychlorinated dibenzofurans Found naturally in the environment – created as a By-product of emissions. Furans can be commonly detected in air, soil, sediments and food. Furans are transported primarily through the air and are deposited on the surfaces of soil, buildings and pavement, water bodies, and the leaves of plants. Most furans are introduced to the environment through the air as trace products of combustion. The principal route by which furans are introduced to most rivers, streams and lakes is soil erosion and storm water runoff from urban areas. Major contributors of furan to the environment include:

- Incineration of Municipal Solid Waste
- Backyard burning of household waste may also be an important source
- Secondary Copper Smelting
- Forest Fires
- Land Application of Sewage Sludge
- Cement Kilns
- Coal Fired Power Plants
- Residential Wood Burning
- Chlorine Bleaching of Wood Pulp
- Incineration of Medical Waste¹⁹

¹⁹ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>)

Polychlorinated dibenzo-p-dioxins Found naturally in the environment – created as a byproduct of emissions. Found naturally in the environment – created as a By-product of emissions. Dioxins can be commonly detected in air, soil, sediments and food. Dioxins are transported primarily through the air and are deposited on the surfaces of soil, buildings and pavement, water bodies, and the leaves of plants. Most dioxins are introduced to the environment through the air as trace products of combustion. The principal route by which dioxins are introduced to most rivers, streams and lakes is soil erosion and storm water runoff from urban areas. Major contributors of dioxin to the environment include:

- Incineration of Municipal Solid Waste
- Backyard burning of household waste may also be an important source
- Secondary Copper Smelting
- Forest Fires
- Land Application of Sewage Sludge
- Cement Kilns
- Coal Fired Power Plants
- Residential Wood Burning
- Chlorine Bleaching of Wood Pulp
- Incineration of Medical Waste²⁰

Polychlorinated naphthalenes PCNs were used in a diverse array of industrial applications, including as transformer and capacitor fluids (predating the PCBs), as flame retardants, plastic and rubber additives, oil additives, fungicides, sealants and in finishes for certain textiles and papers. Other identified uses include dye carrying agents, use in the electroplating industry and as calibration solvents for refractive index determinations²¹.

²⁰ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>)

²¹ An overview of potential ongoing sources of polychlorinated naphthalenes (PCNs) to the marine environment of the North East Atlantic (OSPAR) area, Greenpeace Research Laboratories Technical Note 04/2004, April 2004

Tetrabromobisphenol A

Tetrabromobisphenol A (TBBPA) is a white to off-white powder, and is produced by the bromination of BPA (bisphenol A) with various solvents. Tetrabromobisphenol A (TBBPA) is used as a reactive flame retardant in epoxy, vinyl esters and polycarbonate resins. It is used also as a flame retardant in polymers such as ABS, polystyrenes, phenolic resins, adhesives, paper, and textiles and others.²²

Toxaphene

Pesticide – insecticide for cotton crops, used on livestock, vegetables, soybeans
Banned – Manufacture and use is prohibited in US²³

²² Chemicaland21.com – on **Tetrabromobisphenol A**

²³ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>)

For information purposes the following metals are included in this document as well

Cadmium

Naturally occurring element and metal – used as a protective plating for steel, stabilizer for vinyl chloride, as a pigment in plastics and glasses, as electrode material in nickel-cadmium batteries, and as a component of various alloys.²⁴

Lead

Naturally occurring element and metal – used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield x-rays. Due to health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.²⁵

Mercury

Naturally occurring element and metal – used in thermometers, thermostats, fluorescent lights, preservatives, electrical switches, dental amalgams. By-product of coal power plant emissions. Metallic mercury is used to produce chlorine gas and caustic soda. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.²⁶

²⁴ *Toxicological Profile for Cadmium, 1999*, Agency for Toxic Substances and Disease Registry, United States Public Health Service

²⁵ *Toxicological Profile for Lead, 1999*, Agency for Toxic Substances and Disease Registry, United States Public Health Service

²⁶ US EPA PBT Strategy Web Page (<http://www.epa.gov/pbt/index.htm>); Ecology Publication # 02-03-030 (Ecology PBT working List – response to Public Comments on Appendix E, June 2002).